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INFORMATION

Information Management and Computing at the University of Virginia Health System Volume 6, Number 2

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Finding Knowledge Lost in Data

Jonathan S. Einbinder, MD, MPH, is the Project Director of the Clinical Data Repository and Assistant Professor of Clinical Informatics in the Department of Health Evaluation Sciences. I recently met with him to discuss his views on the Health System's Clinical Data Repository and uncover new developments since our last article in April 1997.

Healthcare investment in technology to organize and manage patient information such as computerized access to longitudinal patient data can achieve tremendous results. The current practice of constructing patient charts and records over months and years on paper creates situations where the clinician cannot gain access to the paper charts when they are needed the most. The absence of informed patient data could affect clinical decisions, lead to improper ordering of tests and procedures, and thereby produce an over-consumption of resources and delay of care. Information Technology and Communication – Academic Computing Health Sciences (ITC-ACHS) in cooperation with the Department

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INFORMATION

University of Virginia
Health System

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of Health Evaluation Sciences, Health System Computing Services (HS/CS), and the Health Services Foundation (HSF) have developed the Clinical Data Repository (CDR) to provide direct access to patient data for clinical research, education, and administration.

The CDR provides an integrated database that pools data from various Health System computer applications. Its contents include inpatient and outpatient diagnoses, procedures, laboratory results, visits, transactions, costs, and charges. Currently, the CDR resides on an IBM RS/6000 Unix machine running a Sybase database management system. The relational database contains data for about 468,000 patients spanning a period of 6 years, and occupies roughly 25 gigabytes of storage space. The Repository has been designed for questions that analyze data across many patients.

The Repository models each patient record as a collection of clinical events that are pertinent to the care of that patient. Each clinical event consists of general information about the activity (what was performed, when it happened, where it happened). In addition, items of information specific to that event can be specified. All personal patient information is encrypted for patient confidentiality.

The data contained within the CDR is updated quarterly as new data becomes available. Data is loaded 45 days after the quarter ends; therefore, in February of 2000 10/99-12/99 data will be added. The 45-day delay provides time for the feeder systems to correct mistakes, process late transactions, document payments, etc. before being added to the clinical repository. Periodically, data is re-loaded to reflect changes that have occurred after the 45-day lag time.

Jonathan Einbinder became Project Director one year ago. The following are excerpts from an interview with Dr. Einbinder.

You assumed the position of director of the Clinical Data Repository one year ago. What attracted you to the project?

The CDR is one of the few “home-grown” information systems at UVa. I enjoy the challenge of trying to build something that people will actually use and that adds value to the Health System. The CDR development team, which includes Ken Scully, Rob Pates, Rob Cordaro, Jane Schubart, Georgia Taylor, and Tom Spraggins, is very talented – they make my job very easy.

I have heard of other similar projects, what is unique about UVa’s data repository?

Nationally, healthcare data warehousing is a very hot area – the CDR is actually one of the more advanced examples of a data warehouse. It contains a wider variety of data than most systems (e.g. combining clinical data like lab results with inpatient and outpatient administrative data) and has a very elegant user interface. Within UVa, there are other data resources. In fact, we draw data from some of them, such as the Health System Computing Services Repository, which contains data from the SMS system. I think the CDR is unique in two respects:

1. It integrates data from multiple sources (e.g. labs and inpatient and outpatient and HSF) into one database.
2. It provides users with direct access to the data using a standard web browser, without requiring that they work through an intermediary or analyst.

Another unique aspect of the CDR is its ability to create hyperlinks between related data items, offering convenient “drill-down” capability with a click of a mouse button. All major data elements of interest are cross-referenced so that one can easily generate an aggregate view of all episodes of care for a single patient or just as easily view all patients with the same diagnosis or same surgical procedure. This capability makes the CDR a very versatile tool for easily viewing and manipulating large amounts of data in a variety of ways.

What new developments have occurred in the past three years?
We have refined the user interface (now in version 2.1), including the introduction of a “guided query wizard,” and are remodeling the database to improve data integration (so the user can build queries without worrying about what system the data originally came from). We have also developed training materials (available on our web site) and developed introductory and advanced classes in how to use the CDR. In addition, we have spent a great deal of time providing one-on-one consultation to users to help them find what they are looking for to meet their needs. And, of course, we have continued to load new data into the CDR on an ongoing basis – as part of the loading process, we are now receiving and processing real time HL-7 data feeds from Health System Computing Services.

What plans do you anticipate for the future of the project?
Ultimately, we would like to see the CDR become a core resource for the Health System. Direct access to integrated data should facilitate this. The objective is to use clinical data as a basis for advanced decision support, so that when we do find out what needs to be done, we can implement it on data that allows us to have a specificity in the match between a rule and the clinical context. In addition, we are exploring ways to integrate information resources like the CDR into the curriculum for medical, nursing, and graduate students. It already is an important teaching resource for the Master of Science Program in Health Evaluation Sciences.

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We are having a slow but steady increase in the number of logons and currently there are more than 260 authorized users. If integrated into the health professional’s daily workflow the CDR can support clinical research and help the Health System to meet its goals of improving the quality and reducing the cost of health care.

For more information about the CDR and to find out how to obtain a login id and password, see **http://www.med.virginia.edu/cdr**. ■

The Health Sciences Library Receives Grant to Digitize Yellow Fever Collection

Thanks to a $250,041 National Leadership Grant from the federal Institute of Museum and Library Services (IMLS), The Claude Moore Health Sciences Library will digitize, arrange, describe and preserve approximately 30,000 pages of manuscript material and 1,000 photographs from the extensive Philip S. Hench Walter Reed Yellow Fever Collection. Through the World Wide Web, the project will provide a model for the integration of state-of-the-art, standards-compliant information technology and scholarly resources to make unique library resources more widely available. The Library was selected as one of 50 institutions (and the only health sciences library) receiving awards totaling $10,405,993 from among the 187 grant proposals received by IMLS.

N.Y. CITY
YELLOW JACK
SHALL WE LET HIM IN?
1878
Mr. Mayor and gentlemen of the Board of Aldermen, the matter rests with you.

Linda Watson, Library Director, looks forward to sharing such a rich archive with the world, but observed that the project has even broader potential impact. “It also provides the resources to more fully explore the use of emerging standards for organizing and displaying electronic resources,” she said. “What we learn will help us and perhaps others, further develop our ‘digital directions’ in the new century.”

Beverly Sheppard, Acting Director of the Institute of Museum and Library Services, noted, “Libraries and museums are more important than ever in this age of information, helping Americans navigate information resources and find meaning in an increasingly complex world. We are proud of these forward-thinking National Leadership projects that will increase access to information and help libraries and museums better serve the public.”

The work of the U.S. Army Yellow Fever Commission of 1900-1901 is the core of the Philip S. Hench Walter Reed Yellow Fever Collection. The Commission, headed by Major Walter Reed (1851-1902), an 1869 graduate of the University of Virginia School of Medicine, made a dramatic discovery and achieved a breakthrough in medicine for which Reed was awarded the Congressional Medal of Honor. At experimental stations just outside Havana, Major Walter Reed and the other members of the Yellow Fever Commission proved that the *Aedes aegypti* mosquito was the vector for the yellow fever virus. Examples of materials from the Philip S. Hench Walter Reed Yellow Fever Collection can be viewed in an online exhibit, *The United States Army Yellow Fever Commission and the Spanish-American War: Science and Politics in Latin America, 1898-1904* (**http://www.med.virginia.edu/hs-library/historical/yelfev/tabcon.html**).

For further information, contact Joan Echtenkamp Klein, Assistant Director for Historical Collections and Services at 804-924-0052 or by e-mail at jre@virginia.edu. ▪

Journals@Ovid makes it easy: Reading full-text articles from your Ovid Search

The Health Sciences Library is pleased to announce the debut of Journals@Ovid - a collection of twenty-six full-text clinical journals available through the Ovid interface. Journals@Ovid replaces the database known as Core Biomedical Collection I. It provides access to table of contents and bibliographic information for all the citations available in the database of 350+ journals, however full-text is limited to the twenty-six titles of the Health Sciences Library subscription. Users can search Journals@Ovid directly by selecting the database at the database selection menu or by limiting the results of a MEDLINE or CINAHL search to full-text. The articles include formatted text and images.

To search the database, log in by typing in your last name and social security number as your user ID and password. Choose Journals@Ovid from the menu. The database can be searched by the author's name, article title, or journal title. The **"browse journals"** button allows you to browse through all the journals by title, table of contents or full-text. Each word of every article in Journals@Ovid, including references and graphics captions, is searchable. The **"About this journal"** button provides journal-specific information such as journal description, usage statement, and instructions for authors.

UVa faculty, staff, and students can access Journals@Ovid from campus libraries, offices, or from home via the UVa proxy server. The Journals@Ovid database appears as a menu choice for users accessing Ovid through Netscape or Internet Explorer. Ovid Windows users accessing Ovid from a green circle icon will need to re-run the set up program to use the Journals@Ovid database. Please contact your department systems administrator for help in re-running the set-up program.

The full-text journal titles available through Journals@Ovid include:

AACN Clinical Issues
Advances in Nursing Science
American Heart Journal
American Journal of Medicine
American Journal of Nursing
American Journal of Obstetrics and Gynecology
American Journal of Surgery
Annals of Internal Medicine
Archives of General Psychiatry
BMJ
Canadian Medical Association Journal
Chest
Circulation
Circulation Research
Heart & Lung
Image: Journal of Nursing Scholarship
JAMA
Journal of Advanced Nursing
Journal of Bone and Joint Surgery (American)
Journal of Clinical Investigation
Lancet
New England Journal of Medicine
Nursing Research
Pediatrics
RN
Science (10-day embargo)

Please contact Reference Desk at 924-5591 or e-mail hslref@virginia.edu, for more information. ■

Tips for Ovid Searching:

■ Our Ovid license allows a limited number of "concurrent" users. If others are using the database at the same time, you may see a message indicating that the number of users exceeds the license. Using the Ovid Web Gateway, you will be pushed back to the logon screen if the license is exceeded. Please be patient and try again later. We are continuously reevaluating the number of licenses for each database.

■ Most of the Ovid databases are installed on a computer on Grounds. Journals@Ovid, however, is a "hybrid" system. The full text is retrieved from Ovid's computers in Utah and you may experience some slowness if the Internet is busy.

■ Images in the Journals@Ovid database can be viewed only using the Ovid Web Gateway and Ovid Java.

Library Renovation News – First Phase Completed!

Following eight long months of construction, we moved into what was formerly the Library's basement the week of December 13-17, 1999. Our new Ground Floor has been transformed from a dark and dank place into a light, airy and beautiful space that houses staff from Collection Management and Access Services, and our historical collections. Also included are rest rooms, a small kitchenette for staff, and a loading dock area with storage rooms.

Historical Collections and Services now have more space than before. The Wilhelm Moll Rare Book and Medical History Room is our showcase - with stunning yellow walls and refinished white cabinetry and new mobile shelving to hold our rare books. Elegant new furniture by Arcadia and Quaker provides beauty and comfort for historical scholars. The Rawles Room is a smaller, more intimate room for seminars given by Library faculty. A large staff workroom provides storage space for Library archives and a secure and specially climate-controlled vault for our most valuable possessions. All new staff work areas were designed with Herman Miller systems furniture.

Historical Collections is now open for business. We invite you to visit. Because the stairwell is temporarily blocked, the only access is via the Library's elevator. You'll need an elevator key that can be checked out at the Circulation Desk. Or you can call Joan Echtenkamp Klein at 924-0052.

Library Renovation News – Phase II Begun!

It's no surprise to anyone that library renovation is not yet complete! Collections, computer workstations and study areas have been shifted around, and who can miss the enclosure around the stairs! The sounds of drilling and banging from below provide a clue as to where the construction contractors are now working – totally demolishing what used to be historical collections, the monograph collection and the Learning Resources Center. Hint: for those of you who enjoy watching construction projects, there is a great view from the patio on JPA of what's happening. This new space is expected to be done in April - check the Library's renovation web site at **http://www.med.virginia.edu/hs-library/general/building/phase2.html** for frequent updates. ■

Tools of the Trade

Burn Your Data

Introduction

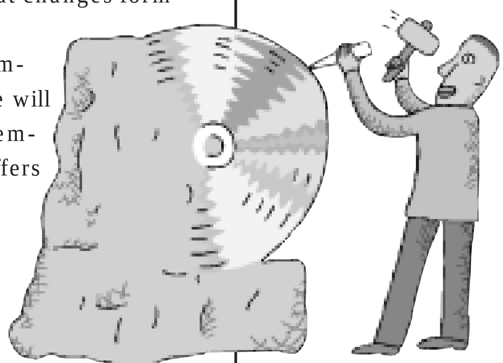
Have you ever needed to transfer several hundred megabytes of scanned images and text to a colleague across town or in another city, and you want to ensure that your colleague can read the data when it arrives? Floppy disks are out; it would take a suitcase of them. E-mail, or using ftp over the telephone lines is out, the data would take hours to transfer and chances are some of it will be corrupted by the time you're done. Zip drives work well, but you'll need several disks and your colleague may not have a zip drive.

Don't despair, just get a recordable CD drive and a few recordable CD's and you're in business. You can write your data to a CD faster than writing to a data tape; and anyone who owns an up-to-date computer, which generally has a CD drive, will be able to read your data. The CD's cost only about $1 each and the drive is reasonably priced at about $200 from your favorite computer store. You can store up to 650 MB of data or 74 minutes of audio per CD and the data is as close to permanent as you can get.

Two Different Technologies

There are two different technologies that allow you to write to the CD media, CD-Recordable (CD-R) and CD-Rewriteable (CD-RW). CD-R media has a very thin film of "foil", which gets heated or "burned" from a laser. The strength of the laser operation during the writing of CD-Rs is such that the information is permanent. If the foil were to be burned again over the same area, the data would be totally destroyed. The advantage of CD-R over other types of optical media is that you can use the discs with most standard CD players. The disadvantage is that you can't reuse a disc.

On the other hand, a CD-RW uses a different metallic material that changes form when heated, but can be "ironed out" at a higher temperature. The CD-RW drive will burn in data at the same temperature as a CD-R, but differs from the latter when it comes to erasing data: the laser switches to a higher power, which smoothes out the disc. As an extra bonus in terms of use, some CD recording software allows users to treat the CD-RW media as a hard drive. One disadvantage of the CD-RW media is that it does not work in all CD players, however CD-Rewritable drives are able to write both CD-R and CD-RW discs.



Choosing between a CD-R and a CD-RW comes down to whether you want maximum compatibility or reusability. However, these days with the prices of CD-RW drives dropping to near $300, you may not need to choose. By purchasing a CD-RW drive, you can ensure that you have both the speed and compatibility of a CD-R and the ease of use and reusability of a CD-RW.

For additional information refer to **http://www.cd-r.com/library.html**.

Note: Copying audio CDs and CD-ROM software can be a violation of U.S. copyright laws.

Double Click

People, events, and news in informatics

Claude Moore Health Sciences Library

Circulation	924-5444
Reference Desk	924-5591
Learning Resources Center	924-5521
Administration	924-5464

Library Hours:

Mon-Thurs	7:30am -12am
Friday	7:30am - 7pm
Saturday	9am - 7pm
Sunday	9am -12am

Extended Hours:

March 3 and 4.

Medical Center Computing

Help Desk	924-5334

ITC-Academic Computing Health Sciences

Information	982-4025

Information Technology & Communication

Help Desk	924-3731

American Society for Information Science (ASIS) presents its spring conference - "Defining Information Architecture" on April 7-9, 2000, in Boston, MA. Speaker topics include: Information Design, Interface Design, Markup Languages, Data Modeling, Human Computer Interaction, Librarianship, and Meta-Data.**http://www.asis.org/Conferences/Summit2000/index.html**

The American Medical Informatics Association (AMIA) Spring Congress will be held in Boston, Massachusetts from May 23 to 25, 2000. The theme of the conference is "Information Technologies for Quality Improvement in Health Care." The conference will focus on advancing our understanding of information needs created by quality scorecards and health care improvement projects and examining the role of standards, vocabularies, and decision support technologies in developing a new generation of information systems.

Over the past two years, the **University Committee on Information Technology (UCIT)**, an advisory committee to **Information Technology and Communications (ITC)** has developed a "Strategic Plan for Information Technology" that focuses on the effective use of technology to support teaching and learning, research and scholarly work, administrative services and systems, and local and global access to the University's resources. The plan can be viewed at **http://www.itc.virginia.edu/oit/org/committees/ucit/home.html**. If you have any comments on the plan, they can be directed to Linda Watson, the Health System representative on the Committee (law6z@virginia.edu), or to **Tom Spraggins**, manager of Academic Computing Health Sciences (**tas@virginia.edu**).

Employee of the Year

The Library held its annual awards ceremony on December 17th. **Wilma Lynch**, the Library's Administrative Services Manager, was named Employee of the Year reflecting her outstanding effort in managing many details of the Library's renovation project. One nomination called her the "Renovation Wizard"! ▟

University of Virginia
HEALTH SYSTEM

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